

Knowledge & Risk Management at the Goddard Space Flight Center



Presentation to
IRS Horizons Mentoring Program
April 13, 2004

Edward W. Rogers GSFC Code 300 Tel: 301 286-4467

The High Expectations of NASA

- ★ NASA Must Achieve Grandly
 - ★ Science and Exploration Goals
 - ★ Engineering and Technology Means
 - ★ Enriching Lives with Meaning
- ★ NASA Must Perform Excellently
 - ★ Mission Safety
 - ★ Mission Success
 - ★ Project Management Cost and Schedule
- ★ NASA Must Lead Distinctively
 - ★ Attract and Motivate the Best in People
 - ★ Organize and Function Efficiently
 - ★ Learn Continuously

All of this requires the consistent ability to reapply knowledge acquired into new projects and processes.



NASA is constantly challenged
to capture and integrate our lessons learned
to effectively manage the risk
involved in space exploration

“The Administration will adopt information technology systems to capture some of the knowledge and skills of retiring employees. Knowledge management systems are just one part of an effective strategy that will help generate, capture and disseminate knowledge and information that is relevant to the organization’s mission.”

The President’s Management Agenda



Risks Have Always Been With Us



The first airplane fatality in history occurred September 17, 1908, when Lt. Thomas Selfridge was killed in this plane piloted by Orville Wright. The accident was caused by propeller separation.



We have Identified and Mitigated them

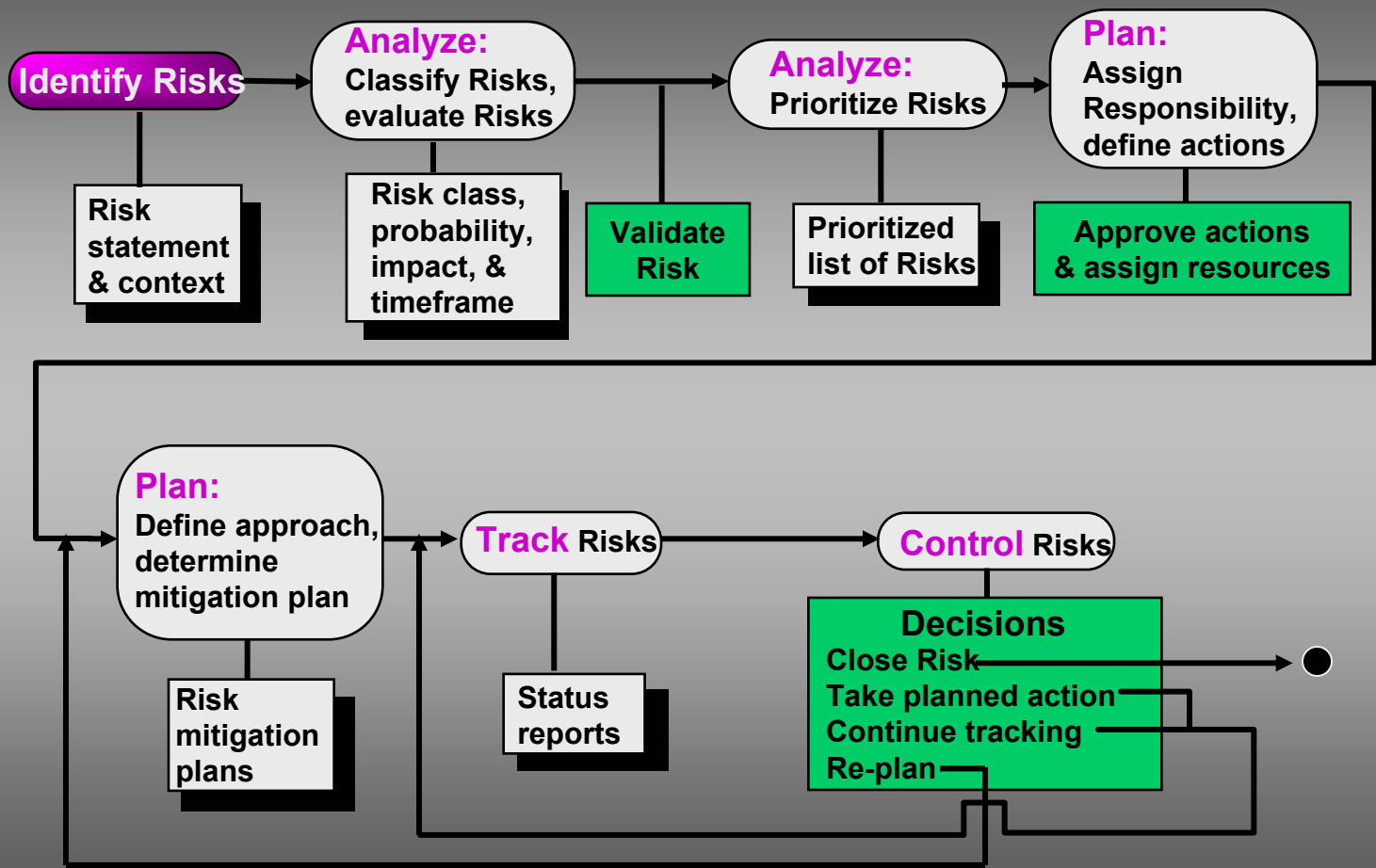


They Will Continue To Be With Us

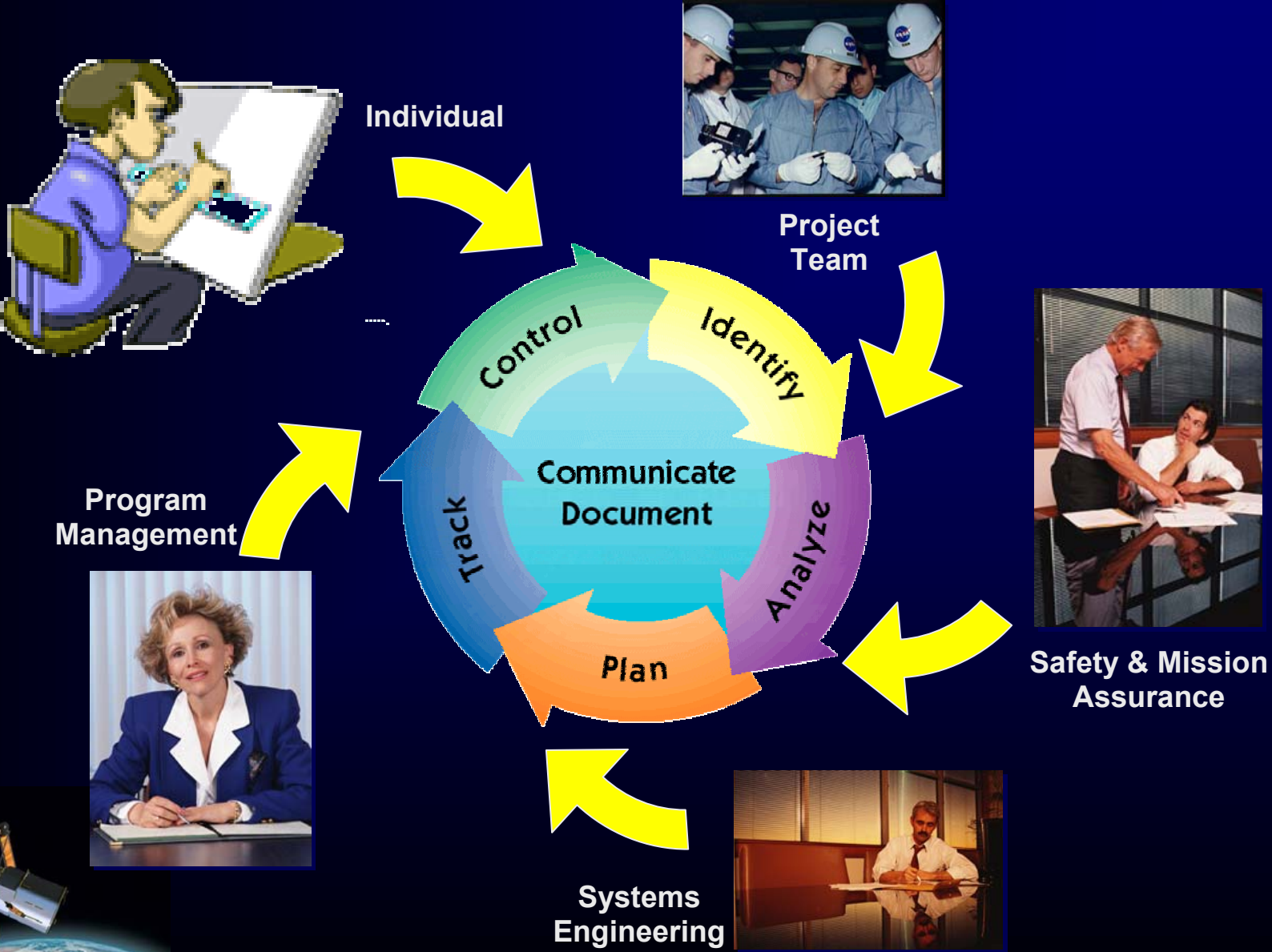


Risk Management Process Flow

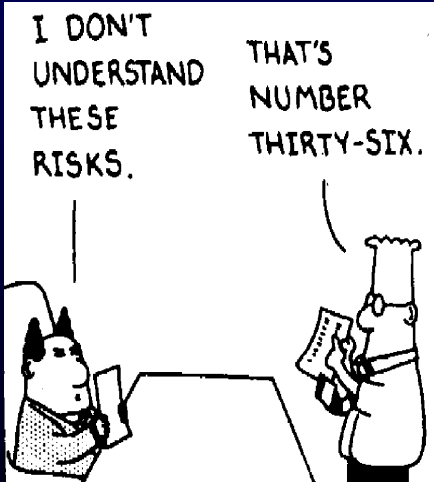
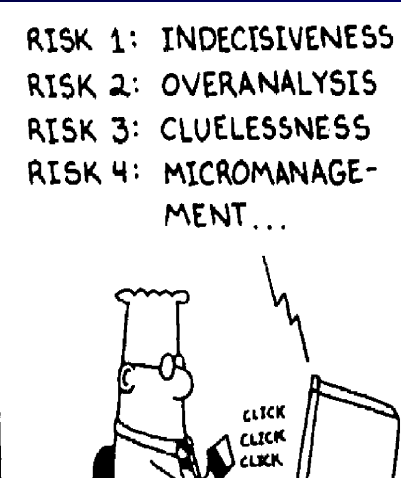
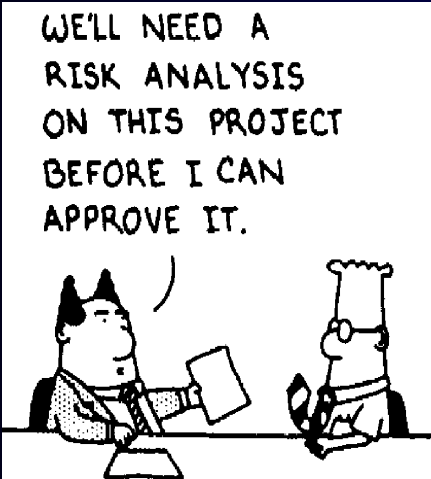
Example:



Risk Management is Everyone's Job



The Risk of Risk Analysis



Dilbert - Scott Adams



Knowledge, Risk and Safety

1. The more you know, the more you realize how much you don't know.
2. The more you realize how much you don't know the more risk you see.
3. The more risk you see, the more concerned you are about safety.
4. The more concerned you about safety, the more you want to know. (see # 1)



NASA KM Strategic Goals

- ★ To sustain NASA's knowledge across missions and generations
 - ✱ KM will identify and capture the information that exists across the Agency
- ★ To help people find, organize, and share the knowledge we already have
 - ✱ KM will efficiently manage NASA's knowledge resources
- ★ To increase collaboration and to facilitate knowledge creation and sharing
 - ✱ KM will develop techniques and tools to enable teams and communities to collaborate across the barriers of time and space



So What is the Problem?

- ☀ Our existing processes not reliable enough.
 1. Designer dependent outcomes (team make up determines team outcome more than team function or structure)
 2. Expert reliance seems to avoid a need for facts
 1. Contour MIB
 2. CAIB Report
 3. Organizational communication processes introduce risk to system (redundancy, reliability delusions, stress points)
 4. Knowledge loops are longer than operational throughput cycle time (knowledge is not timely in its application)

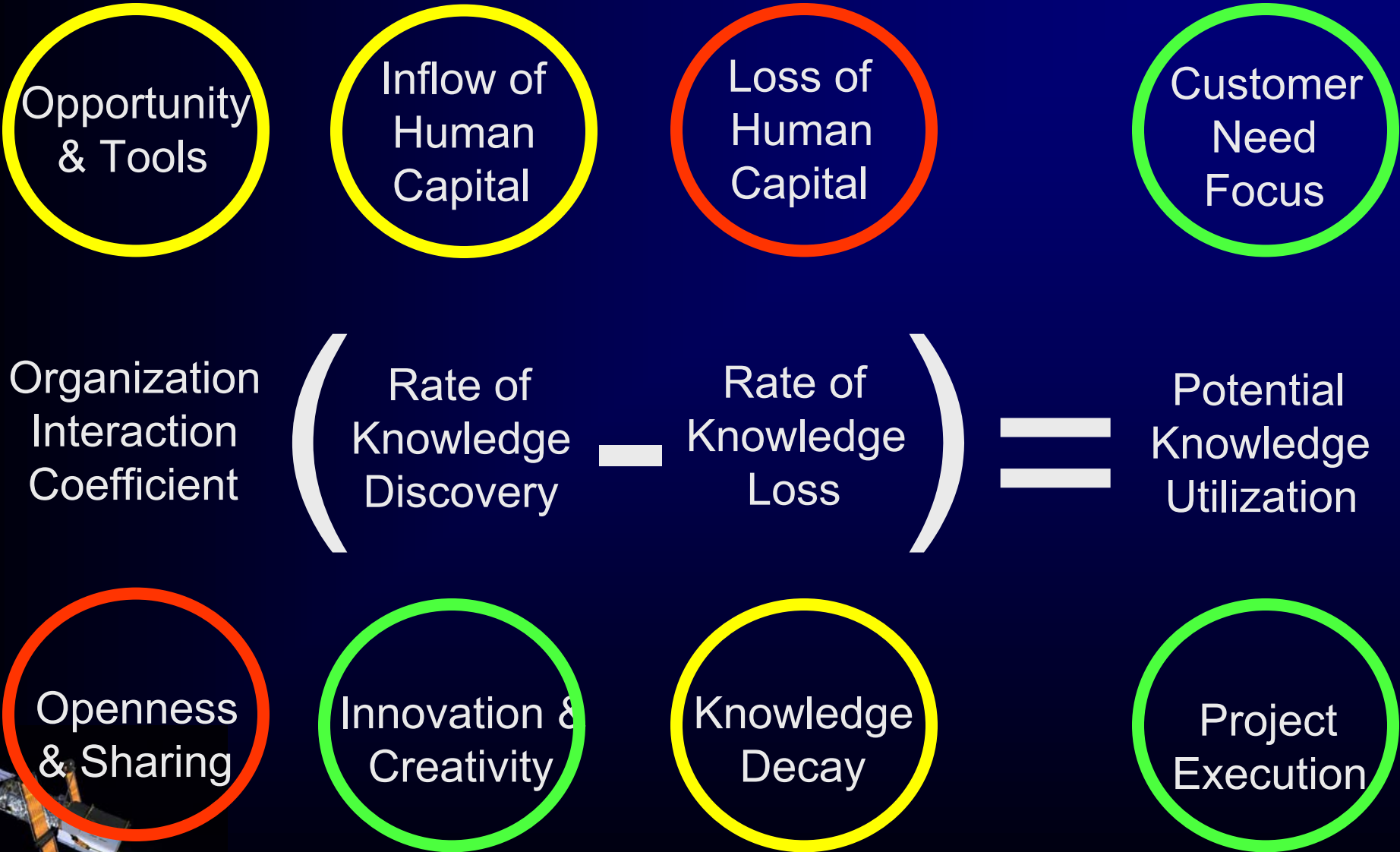


So What is the Problem?

- ☀ Our current systems not fully sustainable.
 - 1. Social networks are decaying faster than they are being reproduced
 - 1. Human capital plan addresses workforce decay
 - 2. Building old systems doesn't meet new needs
 - 2. Knowledge sharing legacy systems are not built around today's workplace structures
 - 1. Digital workplace and electronic relationships
 - 2. Legacy systems still overly reliant on face2face
 - 3. Mentors have a time-space gap with Mentees for effectively sharing knowledge
 - 1. Lack of co-location of teams (distributed)
 - 2. Time demands shrink availability for contact



A Risk View of Knowledge Management



What Should KM Mean at GSFC?

- ☀ Increase in Knowledge Utilization
 - ✱ More Efficient Discovery Processes
 - ✱ Faster Discovery Processes
- ☀ Increase in Mission Safety & Assurance
 - ✱ Better Identification & Mitigation of Risks
 - ✱ Rapid Incorporation of New Knowledge
- ☀ Increase in GSFC Core Competencies
 - ✱ Leverages Expert Knowledge More Effectively
 - ✱ Builds New Expertise More Rapidly



Goals of the KM Office at GSFC

- ✱ Increase the Effectiveness and Efficiency of Knowledge Use at GSFC
- ✱ Craft and communicate a clear vision and plan for KM at GSFC: the need, the means & the goal
- ✱ Help equip with the necessary tools
 - ✱ Organization
 - Processes and policies to support KM
 - Rewards and performance evaluations
 - ✱ IT Infrastructure
 - Easy, secure access and search
 - Simplified documentation and storage
- ✱ Help transition the workforce
 - ✱ Model and walk the KM talk
 - ✱ Demonstrate the Value



Building a KM Architecture

☀ Assets

- ☀ What you gather
- ☀ What you learn

☀ Actors

- ☀ Owners & Hosts
- ☀ Doers & Builders

☀ Application

- ☀ Search & Presentation
- ☀ Appeal and Relevance

☀ Knowledge

- ☀ Recording & Storage
- ☀ Archives/Preservation

☀ People

- ☀ Cooperation to Share
- ☀ Motivation to Learn

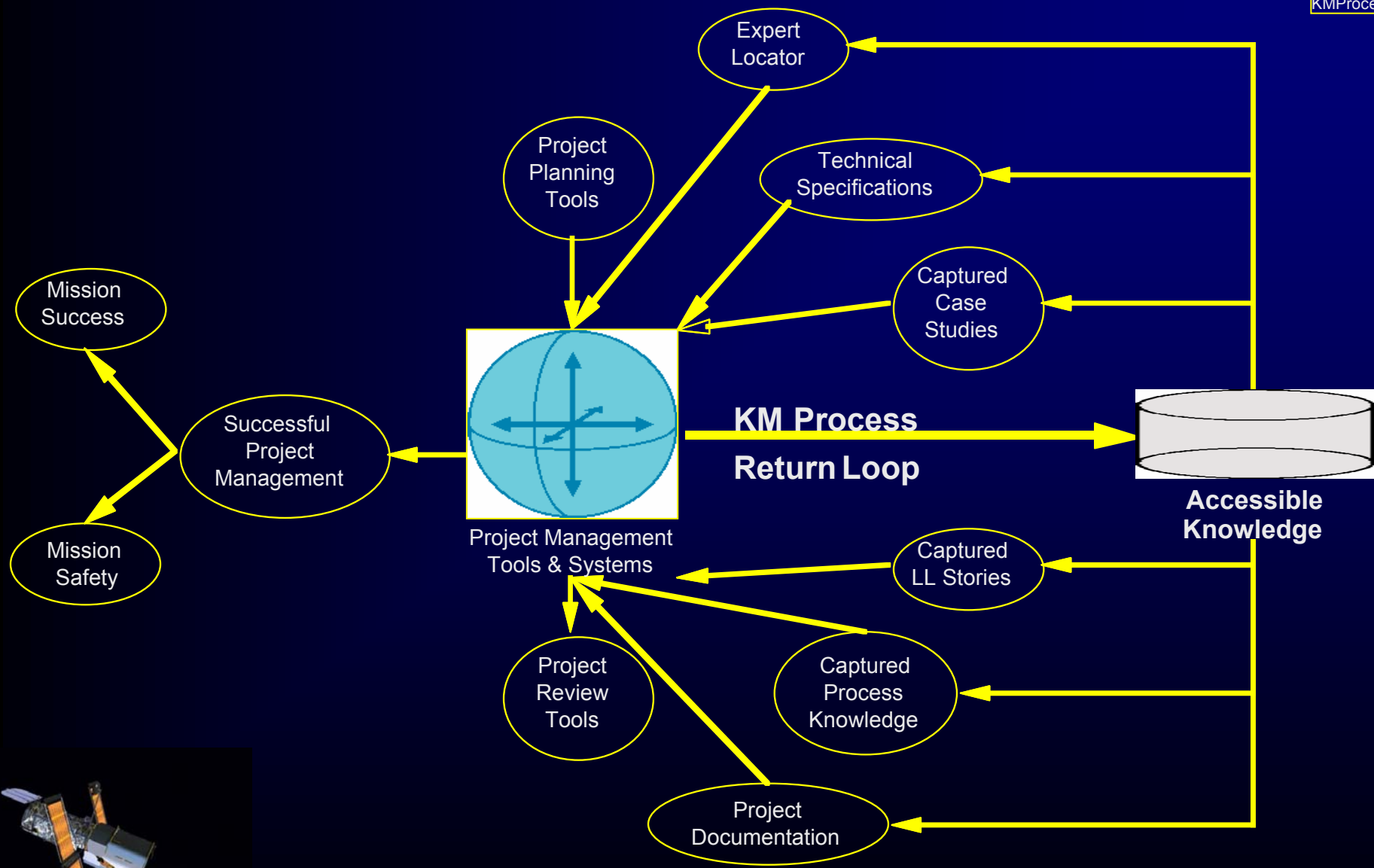
☀ Value

- ☀ Access & Availability
- ☀ Utility and Application



KMProcess

KM Builds a Knowledge Return Loop



Three Pillars of KM Architecture

☀ Documentation

- ☀ Document Management
- ☀ Document Archiving & Preservation
- ☀ Document Search and Reuse

☀ Presentation

- ☀ Sources and References
- ☀ Categories and Organizational Schemes
- ☀ Authenticity and Privacy

☀ Facilitation

- ☀ Motivation for Sharing
- ☀ Means for Sharing
- ☀ Bridging Traditional to Electronic



Documentation

- ★ Systematic Project Documentation
 - ✱ Control of Documents During Projects
 - ✱ Flow of Key Knowledge Sideways
 - ✱ Knowledge Transfer Nodes (Reviews, Problems etc.)
 - ✱ Reapplication of Knowledge During Project
 - ✱ Archiving of Documents
 - ✱ Preservation of Project Life Story



Facilitation

- ✦ Division and Center Forums Promoting Sharing of Knowledge
- ✦ HR Policies and Activities to Motivate KM
- ✦ Transitional Processes to Move from Traditional to Electronic Communications
 - ✦ Webcast forums
 - ✦ Video Capture and Search
 - ✦ Training in Using KM Tools



Presentation

★ Single Searchable Sources

- ★ Meaningful Categorization of Information
- ★ Technical Reference Experts
- ★ Timely and Succinctly Formatted Info

★ Coordinated Knowledge Flow Point

- ★ Simple Authentication
- ★ Seamless Control and Release Procedures
- ★ Meaningful Relationship to Daily Workflow



Goddard Has a Good Start

★ ***Knowledge Management Architect (KMA)***

The role of the KMA is to develop the approach and set priorities across the center for implementing the changes needed to build an effective and efficient knowledge management system. The KMA is equal parts champion, advocate, educator and planner of KM at Goddard.

★ ***Knowledge Management Working Group (KMWG)***

The purpose of the KMWG is to communicate, promote and coordinate continuous and sustained improvements in Knowledge Management at Goddard; and to ensure the appropriate visibility of KM-related achievements and challenges across the Center.



Some KM Actions at Goddard

★ Knowledge Preservation Projects

- ★ Project Library Documents: Current Documents
- ★ Project Legacy: After Mission Reports
- ★ Capturing Webpages: Archiving the Web

★ Knowledge Sharing Forums

- ★ Transferring Wisdom (Storytelling)
- ★ Project Studies (Case Teaching)

★ Electronic Access

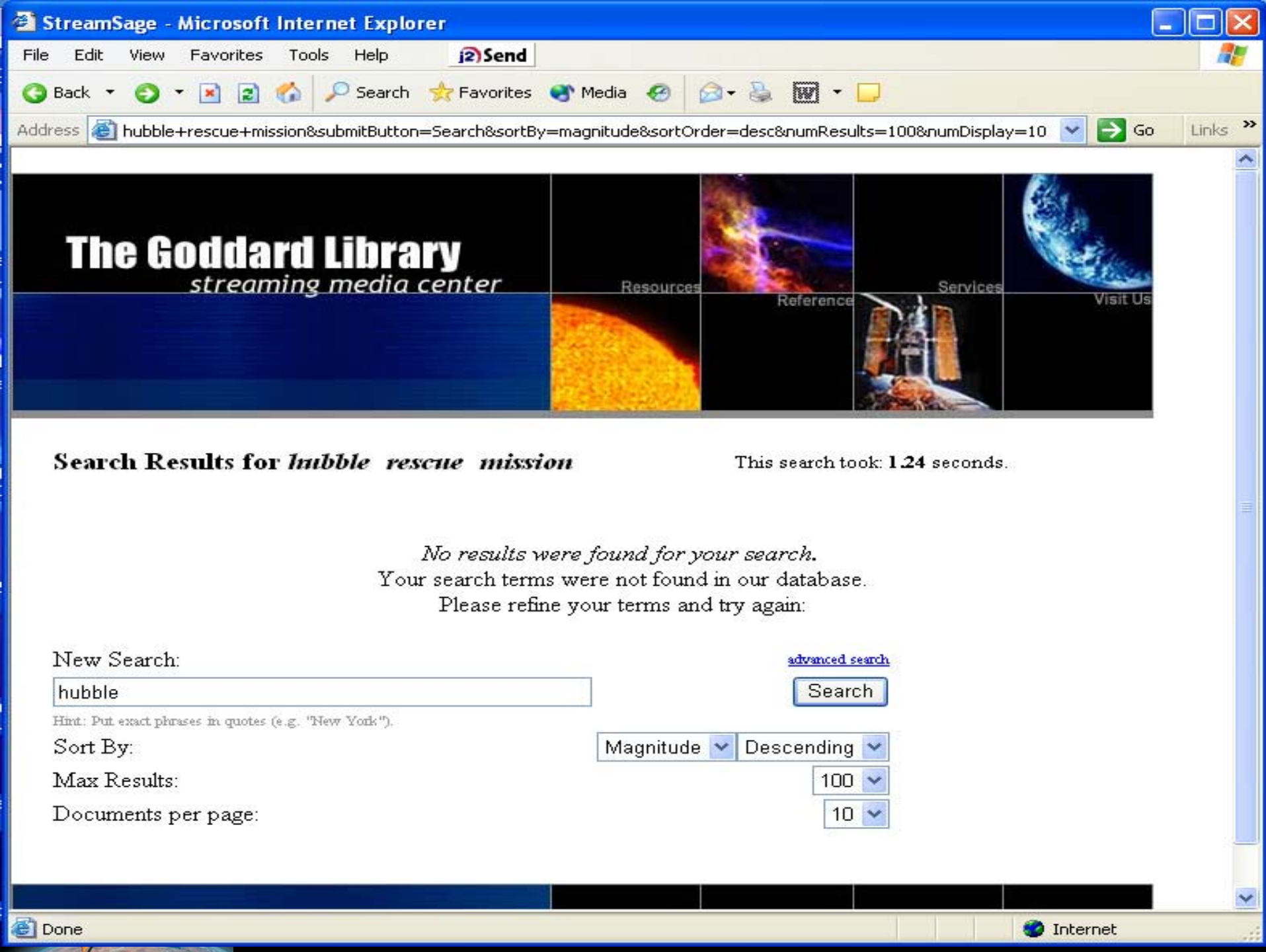
- ★ Goddard Knowledge Exchange Web Space (Goddard Core Metadata Standards)
- ★ Community Web Portals (MYAETD)
- ★ Video Archives (Streaming and Indexing)
- ★ Goddard Gold Rules (Electronic Handbooks)



Video Indexing Pilot

- ✦ In FY02, the GSFC Library received funds from a Center Knowledge Management initiative to implement indexing and retrieval of video segments in response to queries
- ✦ The Library investigated several COTS products and selected StreamSage, Inc.'s product for the pilot
 - ✦ Automatic indexing of speech – no manual editing required
 - ✦ Ability to select segments based on speaker's inflections and pauses, rather than an arbitrary number of minutes





The Goddard Library

streaming media center

Resources

Reference

Services

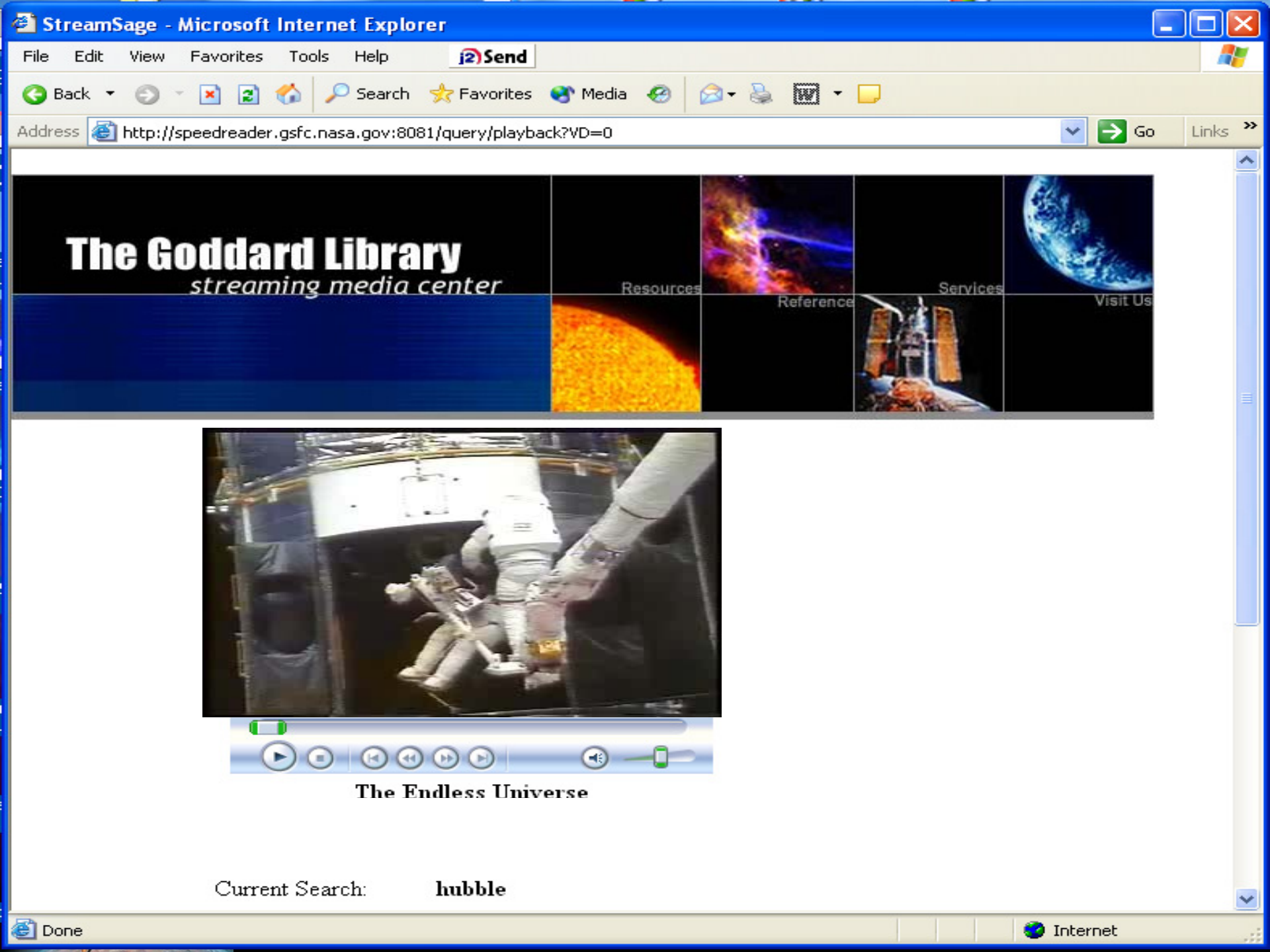
Visit Us

Search Results for *Imbble*

This search took: 1.19 seconds.

Showing results 1 to 4 of 4 total

Relevance	Summary	Relevant Intervals	Date created
89%			
View Intervals	The Endless Universe	31:08.86 - 31:57.74	2002-04-12
Entire Program	Paul Steinhardt	full document	
55%			
View Intervals	The Science of Optics; The History of Art	01:26.47 - 01:39.45	2002-05-20
Entire Program	Charles M. Falco	17:15.56 - 17:22.72	
		full document	
37%			
View Intervals	Euclid's Window: the Story of Curved Space from Thales to	54:42.92 - 55:04.31	2002-05-06
Entire Program	String Theory	full document	
	Leonard Mlodinow		
20%			



Goddard Golden Handbooks

Project Mgmt. Electronic Handbook	Engineering Handbooks by Discipline	Design Handbooks by Mission Type
Based on 7120 & Center Guides	Best Practices and Standards	Trades Wisdom & IMDC Data
Provides Framework for Execution	Provides Agreed Baselines for Eng. Quality	Provides Insight for Formulation & Design Issues
Agency Level Oper. Principles	Center Level Capabilities	Center Level Competencies

Change Approach at Goddard

- ✴ Find Good Stuff and Celebrate It
- ✴ Work with Willing Projects and Leaders
- ✴ Demonstrate Value of the Collective
- ✴ Build on People's Desire for Legacy
- ✴ Make the System Intuitive
 - ✴ Works within existing project processes
 - ✴ Works as part of daily individual work flow
- ✴ Design Supporting Policies as Needed

